REMARKS

Consideration of this continuation application, as amended, is respectfully requested.

During prosecution of U.S. Patent Application Serial Number 09/760,927, to which this application claims priority under 35 U.S.C. §120, the Office Action dated December 12, 2002, made final the rejection of former Claims 1, 3, 4 and 26 directed to a filter element. These claims were cancelled. The remaining method claims were allowed.

Former Claim 1 has been amended to recite a filter element comprising a "ceramic internal layer having at least two hollow recess areas for liquid flow...." Support for this amendment is found, for example, in the Specification at page 2, lines 21-22, former Claim 1 and Figure 1, as originally filed. Former Claim 1 also has been amended to recite one sintered substrate and an essentially continuous separately sintered microporous surface layer. Support for this amendment is found throughout the Specification and Drawings, for example in the Specification at page 3, lines 12-29 and in Figure 2, as filed.

New Claims 24-31 are presented for examination. Support for these claims is found throughout the Specification and Drawings as filed. Specifically, for example, support for new Claim 24 is found at page 3, lines 21-23; support for new Claim 25 is found at page 2, line 31-page 3, line 2 and page 3, lines 21-23; support for new claim 26 is found at page 3, lines 23-24, support for new Claims 27, 28 and 29 is found at page 5, lines 5-6; and support for new Claim 30 is found at page 4, line 29 - page 5, line 3. Support for new Claim 31is found throughout the Specification and Drawings as filed, for example, at page 2, lines 22-24 and claim 2; and claim 3 (as originally filed), respectively.

In the Office Action dated December 12, 2002, Claims 1, 3, 4 and 26 had been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 4,981,589 to Hindstrom, in view of U.S. Pat. No. 4,856,204 to Hindstrom, further in view of U.S. Pat. No. 5,089,299 to Van 'T Veen et al. This rejection does not apply to Claim 1, as amended, and new Claims 24-31.

The December 12, 2002 Office Action relied on Hindstrom '589 for teaching "a filter element for attachment to a capillary suction drier, a ceramic microporous layer having a pore size under 5 microns, supported by a ceramic internal layer with a recess, and having a fitting area, indicated by the Office Action as being "the reduced size neck of fig 1." See Office Action at page 3, penultimate paragraph.

The Office Action relied on Hindstrom '204 merely for teaching a "fitting area," indicated by the Office Action as being element 15 in Figures 1 and 2. Further, the Office Action relied on Van 'T Veen for allegedly teaching a sintered ceramic support underneath a separately sintered ceramic microporous layer. See Office Action at page 3.

Applicants' invention as now claimed, relates to a filter element to be used in removal of liquid from solids containing material, in conjunction with a capillary suction dryer, comprising: a ceramic internal layer having at least two hollow recess areas for liquid flow, the ceramic internal layer being made of at least one sintered substrate which continuously surrounds the at least two hollow recess areas; and at least one essentially continuous, separately sintered ceramic microporous surface layer having a pore size under 5 micrometers, supported by ~~a~~ the ceramic internal layer, the microporous surface layer surrounding the ceramic internal layer.

Hindstrom '589 relates to a multi-layer ceramic filter. The filter described by Hindstrom '589 is manufactured by one of two methods: 1)extrusion or 2)slurry casting. See

Hindstrom '589, column 6, lines 64-67. Hindstrom '589 does not describe in detail the precise methods of slurry casting and extrusion, however conventional slurry casting and extrusion techniques would be unsatisfactory for manufacturing the filter element recited in amended independent Claim 1.

An extruded filter, as described by Hindstrom '589, will have an identical cross-sectional shape throughout the length of the filter element. That is (as shown in Figure 3 of Hindstrom '589), if an extruded filter element has a recess area including a longitudinal hole on the surface of the filter element (element 10 in Figure 3 of Hindstrom '589), the recess area will be continuous from one longitudinal end to the opposite longitudinal end of the filter element, passing the entire length thereof and terminating at a second hole on the outside of the filter element. As such, at least two ends of the filter element will have holes. A filter element with a hole on the surface does not teach or suggest a filter element having a "sintered substrate which continuously surrounds ... at least two recess areas," as claimed in amended Claim 1. That is, if there are holes that communicate with a recess area, the recess area cannot be continuously surrounded. Even if, for example, these holes were closed by a metal plate or some other device, the recess area would still not be "continuously" surrounded. The extruded filter element of Hindstrom '589 does not teach or suggest a filter element in which a ceramic substrate "continuously surrounds" a recess area, much less "at least two recess areas," as claimed in amended Claim 1.

A slurry cast filter, as described by Hindstrom '589 can not have more than one channel for liquid flow. Slurry casting (or slip casting) is achieved through the use of a porous mold which removes water from a slurry via capillary action. By this process, ceramic particles that are suspended in a slurry form a crust on the surface of the mold. When a desired wall

thickness is achieved, the remaining slurry is poured out, and a hollow product remains. Because of the limitations of slurry casting, only a product with a single hollow recess area can be manufactured. Through conventional slurry casting, there would be no way to make the internal divisions that would be necessary to create two or more hollow recess areas for liquid flow.

Additionally, slurry casting (slip casting) is most frequently used for casting relatively thin layers (on the order of a few millimeters) by using a slurry consisting of very fine particles (typically 1-5 microns). When considering coarse particles that are needed to achieve a ceramic internal layer (substrate) that supports a membrane or microporous surface layer, for example, slurry casting is not the choice method.

Moreover, to place a wax insert into a mold (which is also not taught or suggested by Hindstrom '589) and to keep it from moving during casting, while achieving a homogenous and continuous body around the insert would result in the space between the insert and the mold never being completely filled with the ceramic material.

The above-described distinctions between products made by extrusion versus those made by slurry casting may also be seen in Figures 1 and 2 of Hindstrom '589 as compared with Figure 3 of Hindstrom '589. Figures 1 and 2 show a tube with only one channel, but Figure 3 shows an extruded plate having multiple holes.

In sum, if a filter element were manufactured by extrusion, the substrate could *not* "continuously surround" the recess area. If a filter element were manufactured by slurry casting, it could not have "at least *two*" hollow recess areas for liquid flow. Hindstrom does not teach or suggest a filter element or a method that could create a filter element having a substrate that "continuously surrounds" "at least two hollow recess areas," as recited in independent Claim 1.

Thus, neither method described by Hindstrom '589 teaches or suggests the filter element recited in amended independent Claim 1.

Hindstrom '204 and Van 'T Veen do not remedy the deficiencies of Hindstrom '589. The December 12, 2002 Office Action relied on Hindstrom '204 only for teaching a "fitting area," and only relied on Van 'T Veen for allegedly teaching a sintered ceramic support underneath a separately sintered ceramic microporous layer. See Office Action at page 3. However, Hindstrom '284 includes a filter plate having one channel that is filled with a granular material. See Hindstrom '204, Abstract, line 12. Thus, Hindstrom '284 does not teach or suggest "at least two hollow recess areas." Moreover, Hindstrom '204 is manufactured by slurry casting. See Hindstrom '204, Abstract, lines 4-15. As such, the filter element recited in amended Claim 1 could not be manufactured by the method described by Hindstrom '204 for the same reasons it could not be manufactured by the slurry casting method described in Hindstrom '589.

Van 'T Veen is only concerned with a process and apparatus for manufacturing a micropermeable ceramic membrane. Van 'T Veen does not teach or suggest a filter element in which at least two hollow recess areas are continuously surrounded by at least one sintered substrate, as claimed in amended Claim 1.

For at least the above reasons, Applicants respectfully submit that amended independent Claim 1 defines patentable subject matter over Hindstrom '589, Hindstrom '204 and Van 'T Veen, alone or in combination. Claims 24-31 depend from independent Claim 1, and for at least that reason define patentable subject matter over Hindstrom '589, Hindstrom '204 and Van 'T Veen, alone or in combination.

CONCLUSION

In light of the foregoing, Applicants respectfully submit that Claim 1, as amended, and new Claims 24-31 define patentable subject matter over the prior art of record, alone or in combination. An early allowance of all claims is earnestly solicited.

Respectfully submitted,

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